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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,888	04/13/2006	Yasuhiro Yamakoshi	OGOSH152USA	4692
270 7590 12/22/2008 HOWSON AND HOWSON SUITE 210 501 OFFICE CENTER DRIVE FT WASHINGTON, PA 19034			EXAMINER TRINH, HOA B	
			ART UNIT 2893	PAPER NUMBER
			MAIL DATE 12/22/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/575,888

**Applicant(s)**

YAMAKOSHI ET AL.

**Examiner**

HOA B. TRINH

**Art Unit**

2893

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 August 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 4, 5 and 9-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5 and 9-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/888)
- Paper No(s)/Mail Date 8/27/2008
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### **Acknowledgement**

Applicant's amendment filed on 08/27/2008 has been considered and entered. Claims 1-2, 4-5, 9-20 are pending in this present application.

### ***Claim Objections***

1. Claims 1, 4, 17-19 are objected to because of the following informalities: In each of the claims, "at%" is confusing. The examiner assumes applicant has meant for a percentage symbol "%". Appropriate correction is required.
2. Claims 1, 4-5, 17-19 are objected to because of the following informalities: In each of the claims, a phrase "unavoidable impurities" is vague. Appropriate correction is required.
3. Claims 1, 4, 5, 17-19 are objected to because of the following informalities: In each of the claims, a phrase "at least one element selected from among" should be "at least one element selected from a group consisting of" for a proper Markush grouping. Appropriate correction is required.
4. Claims 1-2, 17-20 are objected to because of the following informalities: In claim 1 and claim 19, the transitional phrase "consisting of" is a closed end. However, within the body of the claim 1 and claim 19, applicant includes a Markush grouping which makes the claimed subject matter confusing and vague. Claims 17-18 fall with claim 1 and claim 20 falls with claim 19. Appropriate correction is required.
5. Claims 17-18 are objected to because of the following informalities: In claim 1, the transitional phrase "consisting of" is a closed end. However, claims 17-18 have "comprising of"

which is an open-end phrase. The examiner assumes that the nickel alloy does not have Ti limitation. Appropriate correction is required.

6. Claims 19-20 are objected to because of the following informalities: In claims 19-20, it is unclear as to the "purity" percentage. . Appropriate correction is required.

7.

### ***Drawings***

The New Sheet drawing was received on 08/27/2008. These drawings are accepted.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-2, 4-5, 9-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (2003/0193094; hereinafter as Takahashi) in view of Ichihkawa et al. (applicant's cited, JP56110230), and further in view of Obara et al. (applicant's cited, JP2000169957).

As to claims 1-2, 4, 17-18, Takahashi discloses a nickel alloy sputtering target film 7 comprising Cu, remnant Ni, and impurities to inhibit the diffusion of Sn between a solder bump 6 and a substrate 9 (see figure 2B; paragraph [0058])). However, Takahashi does not explicitly teach a range of concentration for the cooper (Cu) and at least one of V, Cr, Al, Si, Ti and Mo. Note that Ni alloy of Takahashi has the same properties as the present invention to inhibit tin diffusion.

Ichikawa et al. (Ichikawa) discloses an analogous target having a nickel alloy of 24-39% Cu which is overlapping the claimed range for cu concentration.( See abstract)

Obara et al. (Obara) discloses an analogous nickel alloy having 5-20% of V which is within the claimed range for the V concentration. (See abstract)

Therefore, as to claims 1-2, 4, 17-18 as best understood, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the content and concentration of the nickel alloy of Takahashi with the Cu concentration's range, as taught by Ichikawa, for improving the attachment of the target to the substrate, and further to include a specific range of concentration for V, as taught by Obara, for further enhancing the attachment

of the target to the substrate. Note that the unavoidable impurities may also be present in the target.

Further, it is to be expected that a change in temperature, shape, size, thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality. See In re Aller, 220 F.2d 454, 105 USPQ 233,235 (CCPA 1955).

Moreover, the specification contains no disclosure of either the critical nature of the claimed percentage ranges of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen percentage ranges or upon another variable recited in a claim, the applicant must show that the chosen percentage ranges are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

As to claims 2, 5, the copper in the target exists in a solid solution and wherein the nickel alloy is formed by adding said at least of the claimed elements. Note that a phrase "formed by adding ..." provokes a product-by-process limitation. It has been held that the patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F. 2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

As to claims 9, 12, Takahashi discloses the solder bump 6 (fig. 2B) is a Pb-free Sn solder or a Sn solder.

As to claims 10,13, 15, a Cu-Sn intermetallic compound layer between the solder bump 6 and the substrate layer 9 or pad (fig. 2B).

As to claims 11, 14,16, although Takahashi, Ichihkawa, and Obara do not teach a thickness range for the Cu-Sn intermetallic compound layer as claimed, the Cu-Sn layer of Takahashi, Ichihkawa, and Obara has a general thickness. Accordingly, it would have been obvious to one of ordinary skill in the art to use the thickness teaching of Takahashi, Ichihkawa, and Obara in the ranges as claimed, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See In re Aller, 220 F.2d 454, 105 USPQ 233,235 (CCPA 1955).

Further, it is to be expected that a change in temperature, shape, size, thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality. See In re Aller, 220 F.2d 454, 105 USPQ 233,235 (CCPA 1955).

Moreover, the specification contains no disclosure of either the critical nature of the claimed ranges of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen ranges or upon another variable recited in a claim, the applicant must show that the chosen ranges are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

As to claims 19-20, Takahashi discloses a nickel alloy sputtering target film 7 comprising Cu, remnant Ni, and impurities to inhibit the diffusion of Sn between a solder bump 6 and a substrate 9 (see figure 2B; paragraph [0058])). However, Takahashi does not explicitly teach a range of concentration for the copper (Cu) and at least one of V, Cr, Al, Si, Ti and Mo. Note that Ni alloy of Takahashi has the same properties as the present invention to inhibit tin diffusion.

Ichikawa et al. (Ichikawa) discloses an analogous target having a nickel alloy of 24-39% Cu which is overlapping the claimed range for Cu concentration. (See abstract)

Obara et al. (Obara) discloses an analogous nickel alloy having 5-20% of V which is within the claimed range for the V concentration. (See abstract)

Therefore, as to claims 19-20 as best understood, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the content and concentration of the nickel alloy of Takahashi with the Cu concentration's range, as taught by Ichikawa, for improving the attachment of the target to the substrate, and further to include a specific range of concentration for V, as taught by Obara, for further enhancing the attachment of the target to the substrate. Note that the unavoidable impurities may also be present in the target.

Regarding to the structure of the target, the target of Takahashi as modified by Ichikawa and Obara being a single metallographic structure, the average grain size with a specific range, and range for purity as claimed would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teaching of target of Takahashi as modified in the single metallographic structure, purity, and the claimed average grain size in the structure, purity, and



size ranges as claimed, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable structure and size ranges by routine experimentation. See In re Aller, 220 F.2d 454, 105 USPQ 233,235 (CCPA 1955).

Further, it is to be expected that a change in temperature, concentration, shape, size, thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality. See In re Aller, 220 F.2d 454, 105 USPQ 233,235 (CCPA 1955).

Moreover, the specification contains no disclosure of either the critical nature of the claimed structure, purity, and size ranges of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen structure and size ranges or upon another variable recited in a claim, the applicant must show that the chosen structure and size ranges are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

#### ***Response to Arguments***

12. Applicant's arguments filed 8/27/2008 have been fully considered but they are not persuasive. In view of the inadvertent error with the scanning of paperwork in the file, the examiner now acknowledged that applicants indeed submitted the first and second preliminary amendments.

- a. Claims 1-2, 4-5, 9-20 are pending in this application.

- b. Applicant argues that Takahashi in view of Ichihkawa and further in view of Obara do not teach the present invention. The examiner respectfully disagrees. Takahashi teaches the limitation of the present invention, except the concentration percentage as claimed. Ichihkawa and Obara cure the deficiencies in Takahashi. Thus, the rejection is maintained.
- c. Regarding to applicant's argument that there is no specific suggestion or teaching in the references to combine prior art, KSR forecloses that argument where a specific teaching, suggestion, or motivation is required to support a finding of obviousness. Specifically, the motivation need not be found in the references sought to be combined, but may be found in any number of sources including common knowledge, the prior art as a whole, or the nature of the problem itself. See recent Board decision *Ex parte Smith*, --USPQ2d--, slip op. at 20, (BD. Pat. App. & Interf. June 25, 2007), and *KSR International Co. v. Teleflex Inc.*, 550 U.S. --, 82 USPQ2d 1385 (2007).
- d. For the fore going reasons, the claims of the present invention are still rejected.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to (Vikki) Hoa B. Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Ms. Davienne Monbleau, can be reached at (571) 272-1945. The office fax number is 571-273-8300.

Any request for information regarding to the **status** of an application may be obtained from the **Patent Application Information Retrieval (PAIR) system**. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications have ceased to be mailed to applicants with Office actions since June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site ([www.uspto.gov](http://www.uspto.gov)), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy.

Art Unit: 2893

Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

/(Vikki) Hoa B Trinh/

Examiner, Art Unit 2893